Wellhead Protection Through Zoning in Maui County

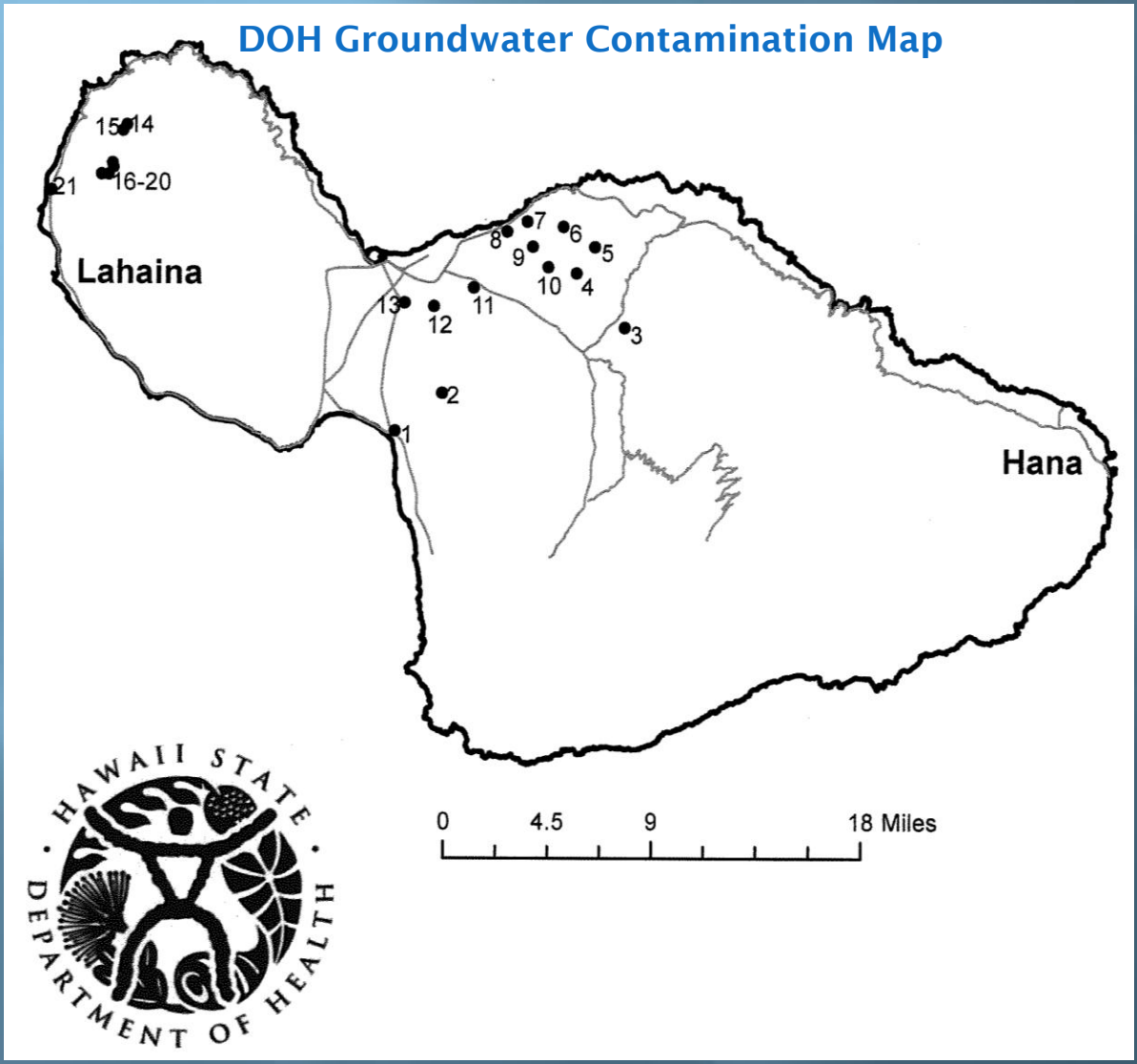
GEOLOGY & GEOPHYSICS
UNIVERSITY OF HAWAII

W·R·R·C

HAWAII STATE DEPARTMENT OF HEALTH

COUNTY OF MAUI
STATE OF HAWAII

Land Use & Groundwater



70% of Maui's drinking water is groundwater
Leaks or spills onto soils from common land use activities can seep into groundwater

1-2-3-TRICHLOROPROPANE
1-2-DIBROMO-3-CHLOROPROPANE
ARSENIC
ATRAZINE
BARIUM
BENZO-A-PYRENE
CHROMIUM
COLIFORM -TCR-
COMBINED RADIUM --226 - 228-
DALAPON
DI-N-BUTYL PHTHALATE
ETHYLENE DIBROMIDE
FLUORIDE
GROSS ALPHA- EXCL- RADON - U
NICKEL
NITRATE
NITRATE-NITRITE
RADIUM-226
SULFATE

Why Wellhead Protection?

Contamination :

Treatment
Monitoring
Alternate water supplies
Remediation
Litigation

Prevention:

Simpler
Less expensive
More reliable over long term

Maui Island Plan:
"Complete and implement DWS wellhead protection program to protect the water quality of public and private wells"

Community Plans:
"Protect water resources in the region from contamination"
"Promote and implement programs for groundwater and wellhead protection"

Cost to clean up groundwater exceeds prevention cost at a 3:1 ratio

How is groundwater protection regulated?

U.S. Environmental Protection Agency
Safe Drinking Water Act

Mandate states to conduct assessments of public drinking water sources, develop Wellhead Protection Program and adopt drinking water rules
Requirements for some potential contaminating activities (oil storage)

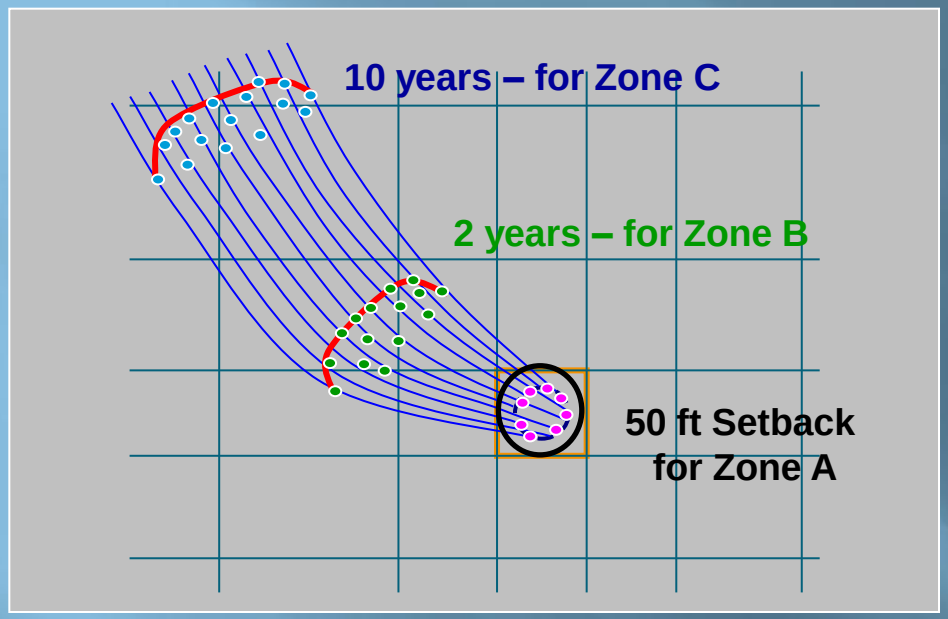
State Department of Health
Safe Drinking Water Branch

- Source Water Assessment
- Wellhead Protection Program -guidelines for preventive measures that are *county/community based.*
- Financial and technical assistance for *wellhead protection implementation activities at the local level*
- Drinking water standards
- Regulations for some PCAs

Maui County Dept of Water Supply
Maui County Dept of Planning
Advisory Committee

- Review regulatory framework
- Public process
- Protection strategies and overlay zoning ordinance

Source Water Assessment



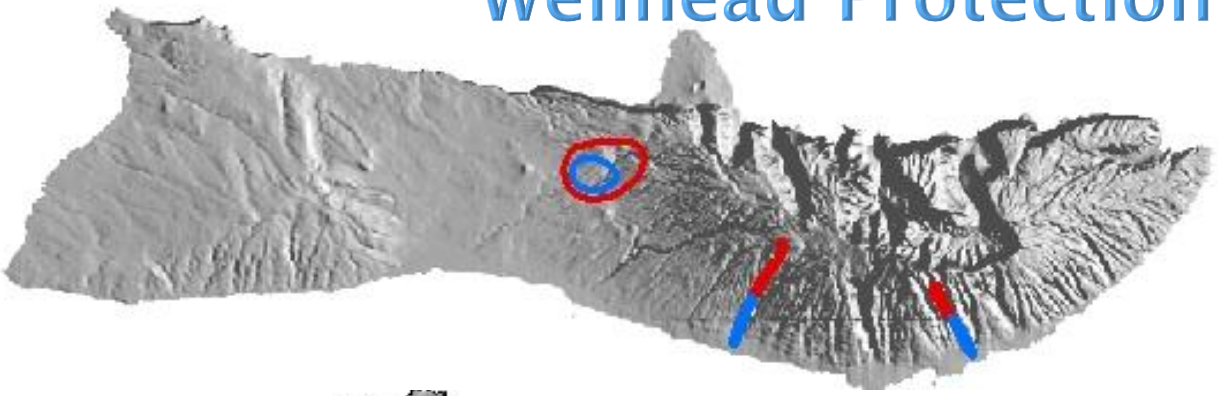
Delineation of the contributing area (Wellhead Protection Area)

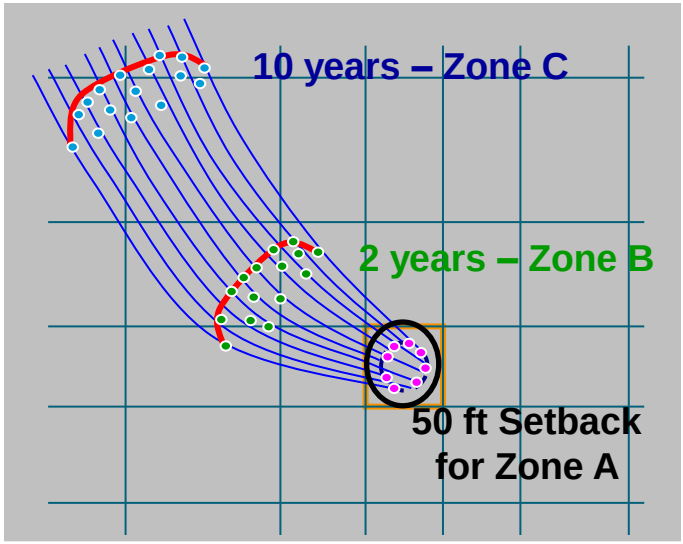
Inventory and survey of potential contaminating activities (PCAs)

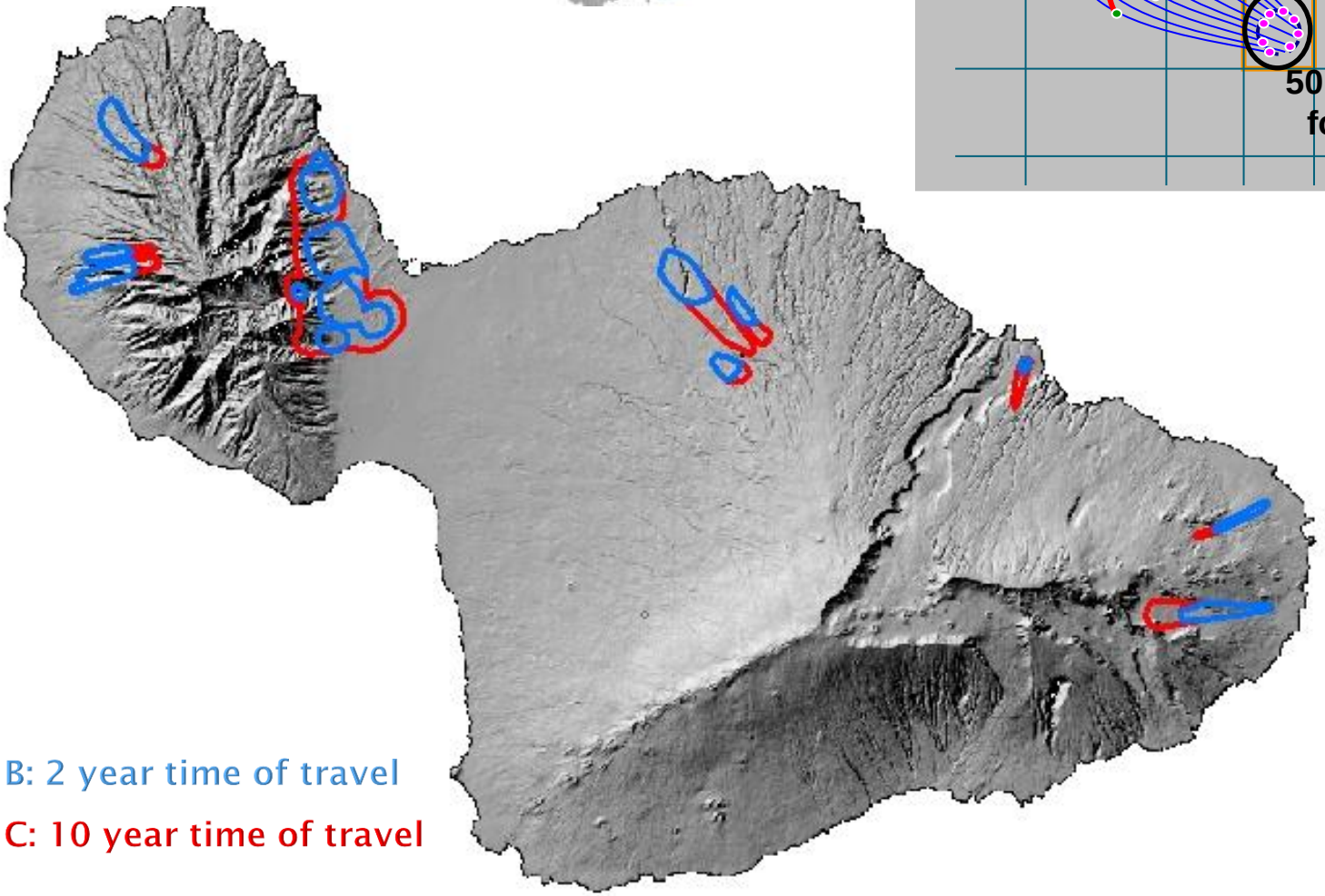
VERY HIGH RISK

- Hazardous waste generators
- Gas stations
- Chemical/petroleum processing/storage
- Dry cleaners/processing
- Metal plating/finishing/fabricating
- Plastics/synthetic fabricators
- Pesticides/herbicides mixing and loading sites
- Airports – maintenance fueling areas
- Landfills/dumps/historic dumps
- Cesspools – High density >1/acre
- Wastewater treatment plants
- Injection wells/dry wells/sumps
- Military installations
- Leaking underground storage tanks
- Confined animal feeding facilities
- Pineapple cultivation
- Sugar cane cultivation
- Improperly abandoned wells
- Wood treatment facilities
- Power plants
- Illegal activities/unauthorized dumping
- Crops using soil fumigants
- Underground injection of commercial/industrial discharges

Wellhead Protection Areas





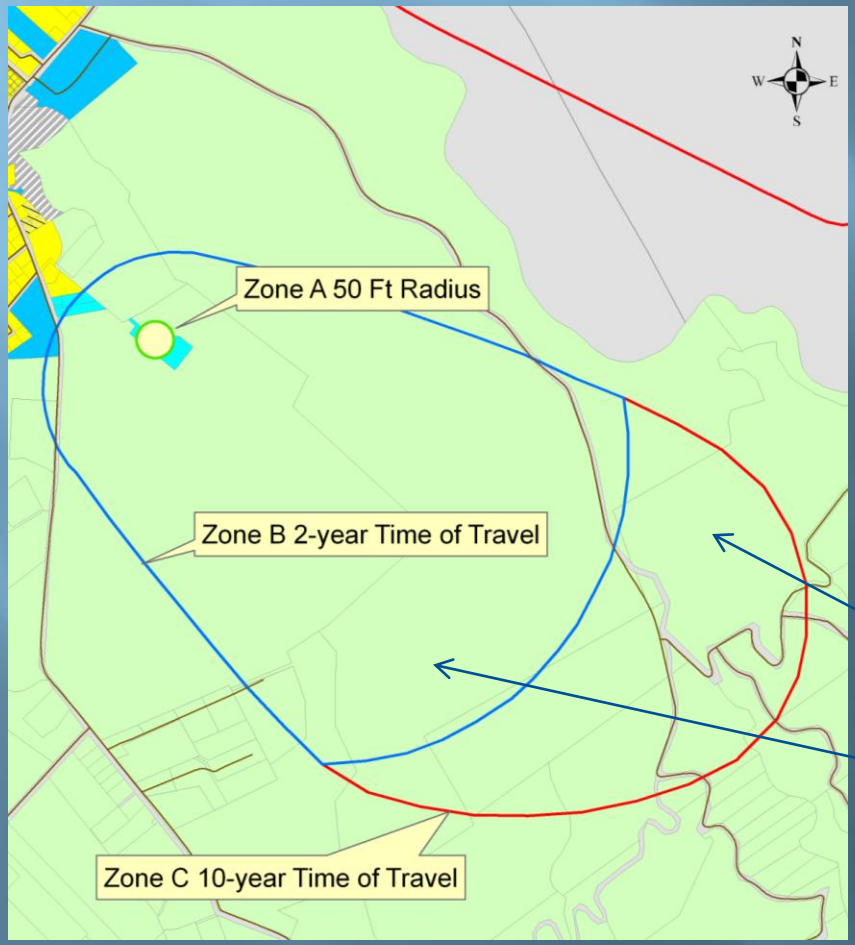


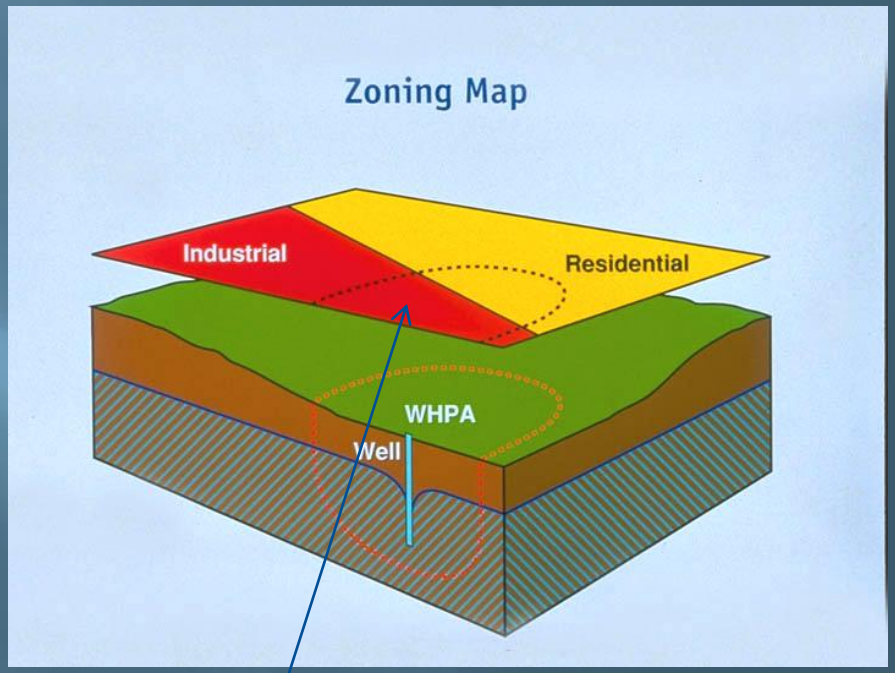
Zone B: 2 year time of travel

Zone C: 10 year time of travel

Wellhead Protection Overlay District

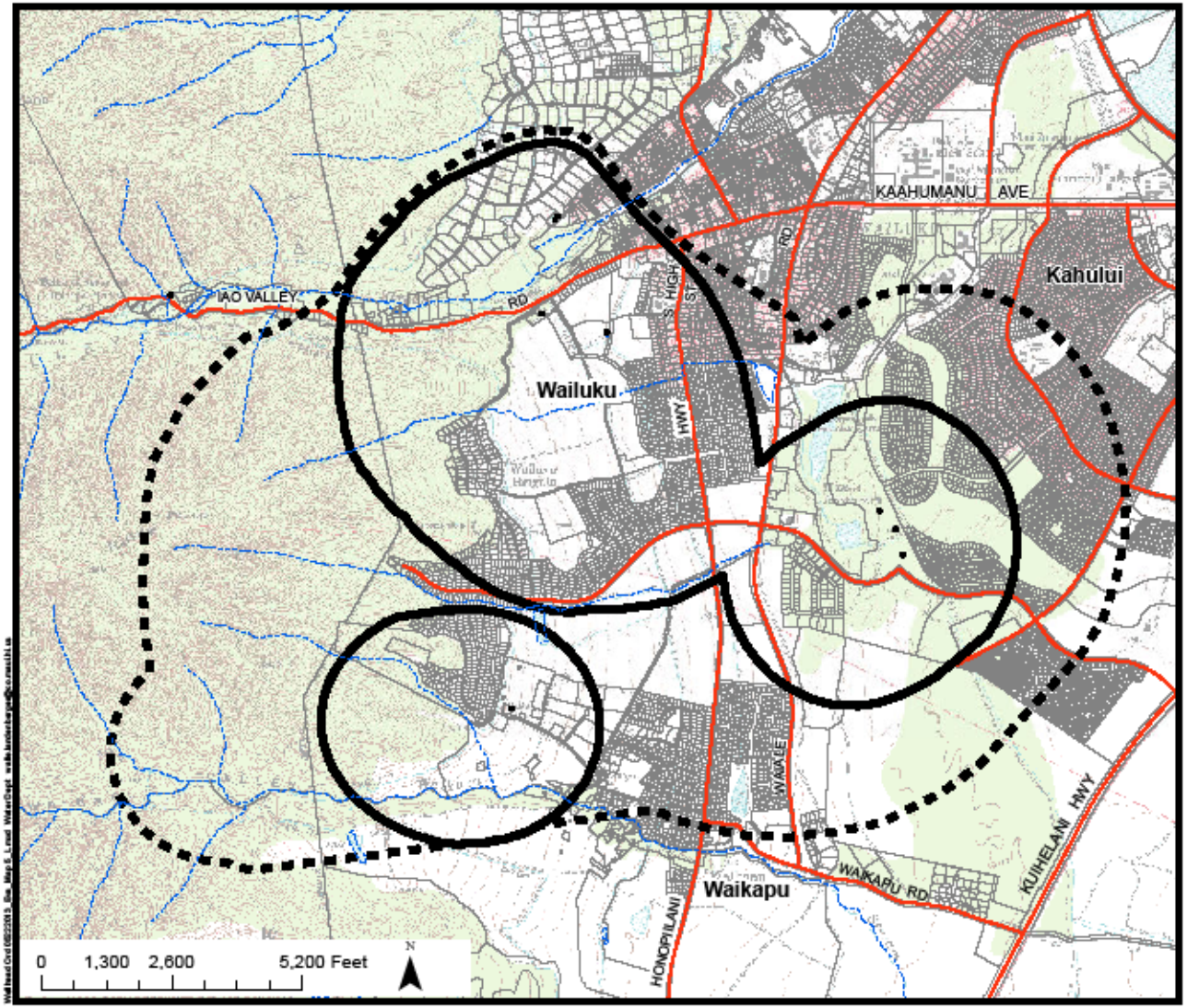
- Apply in modeled capture zones for DWS wells
- Supplement and build upon regulations in place
- Zoning – prohibit new high risk uses
- Permit with best management practices





- New plastic production facility - NO
- New landfill - NO
- New agricultural supply storage: YES – with best management practices

Wellhead Protection Overlay District – Central Maui



LEGEND

- WPOD ZONE A
- WPOD ZONE B - 2 year
- WPOD ZONE C - 10 year
- 2013 PARCEL

NOTE:

WPOD zones were delineated by the University of Hawaii Department of Geology & Geophysics utilizing fixed distance for the ZONE A nearest the well and Time of Travel (TOT) criteria for Zones B and C using the USGS 3-dimensional numerical groundwater model, MODFLOW, followed by the particle tracking program, MODPATH.

ZONE A - Direct chemical contamination zone.
A 50-foot radius around each well to provide protection from vandalism, tampering, or other threats to each well site.

ZONE B - Indirect microbial contamination zone.
Consists of the surface area overlying the portion of the aquifer that contributes water to the well within a 2-year time-of-travel distance.

ZONE C - Indirect chemical contamination zone.
Consists of the surface area overlying the portion of an aquifer that contributes water to the well within a 10-year time-of-travel distance.

OFFICE OF THE COUNTY CLERK
200 SO. HIGH ST., WAILUKU, MAUI, HAWAII 96793

WELLHEAD PROTECTION OVERLAY DISTRICT
MAP No. 5
IAO STREAM TO WAIKAPU, MAUI

APPROVED:	PUBLIC HEARING:
COUNTY CLERK DATE	ADOPTED BY COUNCIL:
APPROVED:	ADOPTED BY MAYOR:
PLANNING DIRECTOR DATE	BILL No./YEAR ORDINANCE No.

DRAFT 04 WPOD Map 5

Regulation of Potentially Contaminating Activities

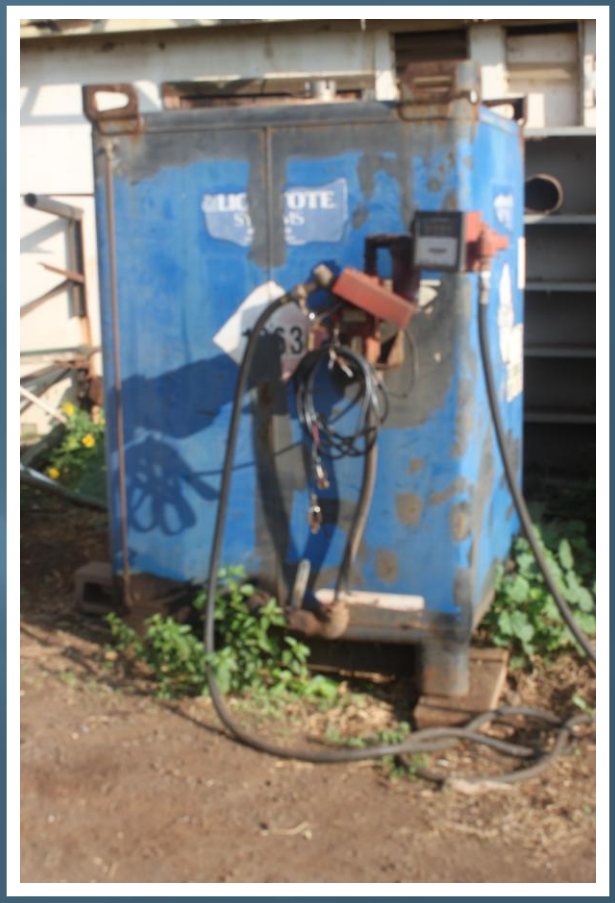
PCA	Authority	Agency	Function
Abandoned /improperly constructed wells	HRS 174C HAR 13-168, 13-183	DLNR -CWRM	Requires casing, plug back, cap, or cement fill and seal well. Also requires well abandonment report and permit from Water Commission
Above Ground Storage tanks	Oil Pollution Act Title 3 40 CFR, Part 112 (Spill, Prevention, Control, and Countermeasure (SPCC) requirements)	EPA	Hazardous material ASTs are regulated. ASTs containing > 1 million gallons petroleum require reporting. ASTs containing hazardous chemicals require a risk management plan. SPCC applies to oil storage in a single AST with a storage capacity greater than 660 gallons, or multiple tanks with a combined capacity greater than 1,320 gallons. SPCC requires procedural and contingency plans, as well as various technical requirements, such as corrosion protection
Animal feedlots	HRS 11-55	DOH	Large facilities (>25 head/acre) require NPDES permit. BMPs for other facilities
Automotive repair/service facilities	County Code 14.21A.080 County Code 16.26.311	DPW	New and existing automotive facilities must install grease and sand interceptor if connecting to public sewer system Repair garages shall be of nonabsorbent materials. Floors shall drain to an approved oil separator or trap discharging to sewers in accordance with the plumbing code.
Cemeteries	None		
Cesspools, septic systems, sewage treatment plants, wastewater disposal	HAR 11-62	DOH	Regulates individual wastewater system siting, distance from groundwater table, design and installation. Cesspools can be restricted or prohibited in established critical areas to protect groundwater. Require septic tank effluent disposal systems to be located at least 1,000 feet from a drinking water well and at least 5 ft above groundwater table. Mandatory hookup to sewer system if available. Residential waste disposal systems are covered under UIC regulations if they serve a multiple dwelling, community or regional system.
Chemical stockpiles	HRS 342J HAR 1-261, 11-273	DOH	Depending on type of chemical, concentration, and amount stored, could be regulated under hazardous waste or pesticide laws.
Construction activities	HRS 342D HAR 11-55-34 (NPDES rules). County Code 20.08	DOH, DPW	General Permits regulate construction projects disturbing more than 5 acres that discharge storm water to state waters. Permit required for grading, grubbing, stockpiling and cut and fill. BMPs required to the maximum extent practicable.
Dumpsites	HRS 339, 340A HAR 11-58.1, 11-68	DOH, Police Dept	Prohibits litter and open dumping on land. Single family composting, agricultural waste, minor sources of solid waste unregulated. Requires conversion of open dumps to facilities that are safe to the environment and to health. Private property owners responsible to remove litter. Police Department should conduct surveillance of reported dumping areas.
Fertilizer application	None		
Golf courses	None	DOA, EPA, DOH	Applicators of registered pesticides must be licensed with DOA/EPA DOH guidelines recommend management activities to reduce environmental impact
Hazardous material spills	HRS 128D, 128 E, HAR 11-451 SARA, TSRA, RCRA, CERCLA	DOH, EPA	Mandatory reporting, cleanup for hazardous spills. Preparation of emergency and contingency plans. Investigation of releases and potential contamination sites. EPA/DOH has the authority to control groundwater contamination as a result of use or disposal of potentially damaging chemical substances.
Hazardous waste	HRS 342J , HAR 11-260-266, 280 RCRA	DOH, EPA	Standards for generators, transporters, and disposal facilities for hazardous waste. Disposal facilities must meet case-by-case groundwater monitoring and protection requirements imposed by DOH. Whether or not waste is regulated depends on composition, concentration and amount.
Landfills	HRS 340A, 342 H HAR 11-58.1, RCRA	DOH	Establishes permit system and design and operation standards to prevent drinking water pollution. Permits require detailed site analysis. Detailed ground water monitoring and protection standards apply to landfills with more than 20 tons of waste. All new landfills require liners. Prohibits liquid waste in any landfill that may pose a risk to groundwater.
Lead acid batteries	HRS 342I HAR 11-273	DOH	Requires recycling of lead batteries and prohibits disposal of electrolytes. Battery retailers must accept lead acid batteries for recycling. Batteries must be stored in safe, labeled containers and can not be accumulated by large scale (>5000 kg/yr) for more than 1 year.
Leaking USTs	HRS 342L, HAR 11-281 RCRA	DOH, EPA	Require reporting of releases and taking action in response to a confirmed release. All USTs must comply with release detection methods.
Particulate matter from airborne sources	HRS 342B, HAR 11-59, 60.1 County Code 20.04	DOH, DPW	Emission standards Prohibits any releases that would constitute a nuisance
Pesticide application and disposal	HRS149A, HAR 4-66, 11-273 FIFRA	DOA, EPA	Applicators of registered pesticides must be licensed with DOA/EPA. Pesticides must be stored in labeled, leak free containers and may not be disposed of except through regulated hazardous waste facilities. The use of a pesticide can be cancelled, suspended or restricted or limited to areas to protect groundwater .
Pesticide leftovers and rinse water	HRS 342J HAR 11-273, 4-66	DOH	Pesticide leftovers may not be accumulated by large quantity handler (>5000 kg/year) for more than one year. Empty containers must be triple rinsed and taken to landfill, or buried 1 ft deep in ground.
Reclaimed wastewater application	HAR 11-62	DOH	Wastewater effluent irrigation systems must submit relevant information to DOH. DOH guidelines offer non-binding application practices.
Sewage disposal and WWTP sludge application	HRS 340A, 342 HAR 11-58, 11-62	DOH	Require permit to control water pollution. DOH must approve each plan for sludge application/disposal. Sludge disposal is only allowed in permitted sanitary landfills, in authorized wastewater systems, by incineration as specified by DOH and reused for agricultural purposes as specified by EPA.
Underground injection wells	HRS 340E, HAR 11-23 40 CFR Part 144	DOH, EPA	Regulates all injection well activities to protect groundwater. Prohibits siting of an injection well within ¼ mile of any drinking water well and above the UIC line. EPA UIC regulations prohibit construction of new large-capacity cesspools, effective April 5, 2000. Existing systems must be upgraded or closed by April 5, 2005.
Underground Storage Tanks	HRS 342L HAR 11-281	DOH	1/28/00 Rule regulates all USTs storing petroleum and hazardous substances with a capacity greater than 10 gallons, including existing USTs. Secondary containment required for tanks installed on or after adoption date. Existing tanks must either meet established performance standards, upgrade system to internal lining or cathodic protection or follow closure requirements. Spill and overfill prevention, release detection methods, monthly monitoring of possible groundwater contamination, reporting and release mitigating action required for all USTs.
Waste oil disposal	HRS 342, HAR 11-279	DOH	Prohibits new, used or recycled oil discharge into the environment. Requires permit for handling and recycling used oil.
Waste water discharge	NPDES program, HAR 11-55	DOH	Permit regulation of point source discharges of wastewater and storm waters into State waters

Challenges to using Zoning for Groundwater Protection

- No precedent on Maui
- Public perception – invisible, no cause and effect
- Development pressures and impact on land values
- Support for pro-active protection, but no more regulations!
- Mistrust of computer modeled capture zones
- Diversity of PCAs

Best Management Practices

Preventive measures provide more cost-effective solutions for maintaining water quality than implementing treatment or finding an alternative source for reliable and safe drinking water.



- Store potentially contaminating substances on an impervious surface with a secondary containment
- Secure storage areas against unauthorized entry
- Label containers clearly and inspect storage areas regularly
- Keep spill control and containment readily available

Incentives for Business Owner:

- *Reduce potential spill clean up costs*
- *Reduce environmental liability*
- *Increase employee safety*

Source Protection Financial Incentives and Outreach

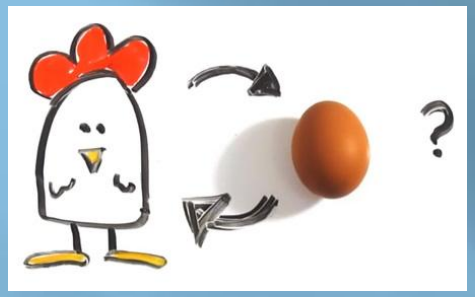
Financial and technical assistance to retrofit or upgrade potentially contaminating operations within capture zones of DWS wells

Used Oil Recycling and Disposal
Contract a licensed Used Oil Recycler to test for contamination by chlorinated solvents and haul away for disposal.

Used Automotive Battery Recycling and Disposal
Instruct business owners on proper battery recycling and disposal practices and direct them to licensed battery recycling businesses. Collect and deliver plastic-cased batteries to a licensed recycler.

Abandoned Vehicles
Remove as many derelict and abandoned vehicles as possible capture zones through partnership with Maui County's Solid Waste Division's Abandoned Vehicles Program.

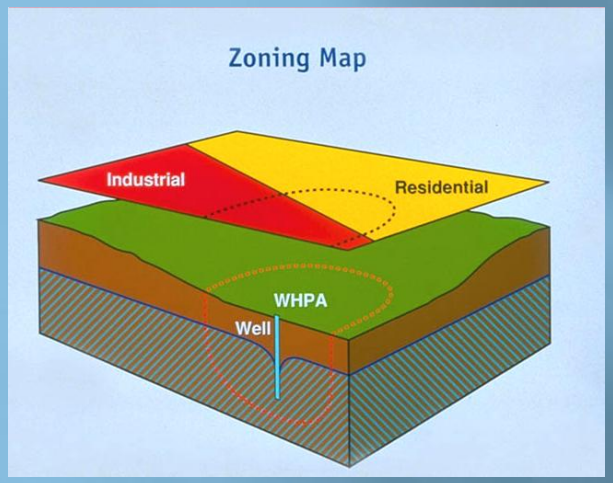
What about new wells?



Well siting:

- Not owned in advance
- Source water assessment preceding site selection
- Preference to sites of low vulnerability from current and historic PCAs
- Protection at the earliest time possible

Comprehensive Source Protection Strategy



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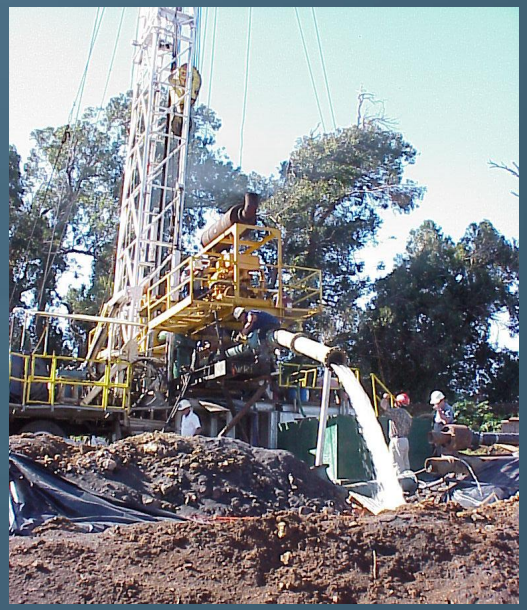

Wellhead Protection Zoning:
Restrict new high risk uses in wellhead protection areas

Best Management Practices:
- ***Structural or operational***
- ***Public education***

Well siting:
- ***Source water assessment preceding site selection***
- ***Preference to sites of low vulnerability***
- ***Protection at the earliest time possible***

www.mauiwater.org